

What is claimed is:

1. ~~49.~~ In a process for producing a product using a material which is electrochemically loaded with an isotopic fuel, a method of controlling the loading which includes in combination:
supplying said isotopic fuel to said material,
providing means for loading said isotopic fuel into said material ^{to} *resultant*
~~saturate~~ said material,
then providing means for producing a change in ^{the} active quantity
of said isotopic fuel within said material,
creating thereby a catastrophic diffusion flux of said isotopic fuel ^{desired} *result*
within said material.

2. ~~50.~~ A method as in claim ~~49~~ wherein said material is a member of the group consisting of palladium, Groups IVb, Vb, and rare earth elements. *NA*

3. ~~51.~~ A method as in claim ~~49~~ wherein ~~said~~ second material is a member of the group consisting of deuterium or deuterons.

4. ~~52.~~ In a process using an isotopic fuel loaded into a material, a two-stage method for controlling the loading which includes in combination:
supplying said isotopic fuel to said material,
providing means for loading said isotopic fuel into said material ^{to} *result*
~~saturate~~ said material,
then providing means for producing a change in ^{the} active quantity
of said isotopic fuel within said material,
creating thereby a catastrophic diffusion flux of said isotopic fuel ^{desired} *result*
within said material. *final result*

5. ~~53.~~ A method as in claim ~~52~~ wherein said material is a member of the group consisting of palladium, Groups IVb, Vb, and rare earth elements.

6. ~~54.~~ A method as in claim ~~52~~ ⁴ wherein ~~said~~ second material is a member of the group consisting of deuterium or deuterons.

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7. A method as in claim 52, where the material is loaded electrochemically.

8. A method as in claim 52, where the said means to produce a change in the active quantity of said isotopic fuel within said material is by a change in temperature of said material.

9. A method as in claim 52, where the additional step is taken of obstructing the diffusion flux of said fuel by a diffusion barrier located within said material.

10. A method as in claim 52, where the additional step is taken of removing said product produced.

11. A method as in claim 58 wherein said product is heat and said means of removing heat utilizes a member of the group of high thermal conducting devices, including a thermal pipe, a diamond filament, and a polymer filled with diamonds.

12. A method as in claim 58 wherein said means of removing said product utilizes an applied magnetic field.

13. An apparatus to produce a product using a material loaded with an isotopic fuel, which includes in combination:

means to supply said isotopic fuel to said material,
means to load said isotopic fuel into said material to saturate said material,
means to produce a change in the active quantity of said isotopic fuel within said material,
means thereby to produce a catastrophic diffusion flux of said isotopic fuel within said material.

14. An apparatus as in claim 61 wherein the isotopic fuel is a member of the group consisting of deuterium or deuterons.

15. An apparatus as in claim 61 wherein said material is a member of the group consisting of palladium, Groups IVb, Vb, and rare earth elements.

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~~16~~ An apparatus as in claim ~~61~~ wherein said means to load said isotopic fuel into said material is electrochemical.

~~17~~ An apparatus as in claim ~~61~~ wherein additional means are provided to obstruct the diffusion flux of said isotopic fuel by a diffusion barrier located within said material.

~~18~~ An apparatus as in claim ~~65~~ wherein said diffusion barriers are multiple and are arranged as alternating layers of diffusion barriers.

~~19~~ An apparatus as in claim ~~61~~ wherein the means produce a change in the active quantity of said isotopic fuel within said material is by a change in temperature.

~~20~~ An apparatus as in claim ~~61~~ which includes a high modulus incompressible structural barrier surrounding said material filled with said isotopic fuel.